

members on the fan nacelle are provided by multiple moveable cowlings, arranged circumferentially about the rear of the fan nacelle 34. The cowlings are moveable generally axially to vary the fan nozzle exit area 40.

[0016] Referring to FIG. 2, a controller 50 is in communication with the actuator 46, which manipulates the flaps 42 between open and closed positions in the example shown. Modulating the flap position changes the flow characteristics through the core and/or fan nacelles 12, 34. In this manner, the flow control device 41 can actively manage the axial thrust loading of the low pressure spool 14.

[0017] In one example, the low pressure spool 14 includes a first portion 14a that supports the low pressure compressor 16 and low pressure turbine 18. The gear train 22 interconnects the first portion 14a to a second portion 14b, which supports the fan 20. The first portion 14a is shown schematically supported by a journal bearing 48 and a thrust bearing 49. A thrust load sensor 54 is associated with the thrust bearing 49 to measure the thrust loads exerted on the thrust bearing 49 along axis A by the first low pressure spool portion 14a during operation of the engine 10.

[0018] The thrust load sensor 54 is in communication with the controller 50. The controller 50 monitors the thrust bearing load and records the values in a memory 56. In operation, the controller 50 commands the actuator 46 to manipulate the flaps 42 to effectively change the fan nozzle exit area 40, ensuring that the axial load on the thrust bearing 49 does not reach an undesired level of thrust load. In one example, a speed sensor 52 is also in communication with the controller 50 to provide rotational speed information relating to the low spool 14. In one example, the fan nozzle exit area 40 is increased to reduce the thrust load on the thrust bearing 49 to reduce wear and extend its life. However, it should be understood that the fan nozzle exit area 40 may be decreased under some operating conditions to decrease the thrust load.

[0019] Although a preferred embodiment has been disclosed, a worker of ordinary skill in this art would recognize that certain modifications would come within the scope of the claims. For that reason, the following claims should be studied to determine their true scope and content.

What is claimed is:

1. A turbine engine comprising:
  - a bearing;
  - a nacelle including a nozzle exit area;
  - a flow control device adapted to effectively change the nozzle exit area; and
  - a controller programmed to monitor the bearing and command the flow control device in response to an undesired load on the bearing.
2. The turbine engine according to claim 1, wherein the bearing supports a spool having a turbine, and the nacelle is a core nacelle surrounding the turbine, and a fan is arranged upstream from the core nacelle and coupled to the spool, the fan nacelle surrounding the fan and core nacelle and providing a bypass flow path that includes the fan nozzle exit area.

3. The turbine engine according to claim 2, wherein the spool is a low pressure spool, and the turbine is a low pressure turbine.

4. The turbine engine according to claim 3, wherein the low pressure spool includes first and second portions, the first portion supporting the low pressure turbine and the second portion supporting the fan, and a gear train interconnecting the first and second portions of the low pressure spool.

5. The turbine engine according to claim 3, wherein the low pressure spool supports a low pressure compressor, and a high pressure spool coaxial with the low pressure spool and supporting a high pressure turbine.

6. The turbine engine according to claim 1, wherein the flow control device includes a member moveable between open and closed positions to physically change the nozzle exit area.

7. The turbine engine according to claim 1, wherein the flow control device includes an actuator for manipulating a member to effectively change the nozzle exit area.

8. The turbine engine according to claim 2, wherein the bearing is a thrust bearing and the undesired load is an undesired thrust load along an axis provided by the spool.

9. The turbine engine according to claim 1, wherein the controller is programmed to acquire load data, and a memory adapted to store the load data.

10. A method of regulating a bearing load within a turbine engine comprising the steps of:

- measuring a bearing load;
- detecting an undesired bearing load from the bearing load; and
- changing an effective nozzle exit area in response to the undesired bearing load to maintain a desired bearing load.

11. The method according to claim 10, comprising a rotating spool, the bearing load is a thrust bearing load associated with the spool.

12. The method according to claim 11, comprising supporting a turbine on the spool.

13. The method according to claim 11, comprising coupling a fan to the spool through a gear train.

14. The method according to claim 10, comprising commanding an actuator to effectively change the nozzle exit area.

15. The method according to claim 14, wherein the actuator commanding step includes rotating a flap about a pivot.

16. The method according to claim 14, wherein the actuator commanding step includes moving a cowling along an axis.

17. The method according to claim 10, wherein the changing step includes physically changing the nozzle exit area.

18. The method according to claim 17, wherein the nozzle exit area is provided at an exit of a bypass flow path arranged between fan and core nacelles.

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